REMARKS

Claims 1-3, 6, 9, and 12-15 are pending in the application. In this response, claims 1, 6, 9, and 12 have been amended and claims 4, 5, 7, 8, 10, 11, 16, and 17 have been cancelled. Exemplary support for the claim amendments can be found throughout the specification and claims as originally filed. See, for example, cancelled claims 4, 5, 7, 8, 10, 11, 16, and 17.

Initially, Applicants would like to thank the Examiner for suggesting claim amendments to overcome the outstanding rejections under 35 U.S.C. §§ 112 and 101, during the phone interview conducted on August 26, 2008.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

Rejection under 35 U.S.C. § 112

Claims 1 and 6 have been rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the written description requirement. In particular, it is the Examiner's position that the addition of the claim limitation "wherein at least one of the foregoing steps is carried out on a programmable device" to claims 1 and 6 via claim amendments allegedly introduces new matter.

Without conceding the propriety of this rejection, Applicants respectfully submit that the feature "wherein at least one of the foregoing steps is carried out on a programmable device" has been deleted from claims 1 and 6. Accordingly, the rejection under 35 U.S.C. § 112, first paragraph, is moot.

Rejection under 35 U.S.C. § 101

Claims 1 and 6 have been rejected under 35 U.S.C. § 101 because the claimed invention is allegedly directed to non-statutory subject matter. The rejection is respectfully traversed.

Applicants respectfully submit that claims 1 and 6 have amended to recite the feature "inputting audio signal and extracting audio data from said audio signal", as suggested by the Examiner during the phone interview conducted on August 26, 2008. In light of the foregoing amendment to claims 1 and 6, Applicants respectfully submit that the rejection under 35 U.S.C. § 101 should be withdrawn.

Rejection under 35 U.S.C. § 102

Claims 1-4 and 6-16 have been rejected under 35 U.S.C. § 102(b) as allegedly unpatentable over U.S. Patent No. 6,438,525 (hereinafter "Park"). The rejection is respectfully traversed.

Initially, it should be noted that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Amended independent claim 1 recites a coding method comprising: inputting audio signal and extracting audio data from said audio signal; slicing the audio data so that sliced audio data corresponds to a plurality of layers; obtaining scale band information and coding band information corresponding to each of the plurality of layers; coding additional information containing scale factor information and coding model information based on scale band information and coding band information

corresponding to a first layer; obtaining quantized samples by quantizing audio data corresponding to the first layer with reference to the scale factor information; Huffman-coding the obtained plurality of quantized samples in units of symbols in order from a symbol formed with most significant bits (MSB) down to a symbol formed with least significant bits (LSB) by referring to the coding model information; and repeatedly performing the steps with increasing the ordinal number of the layer one by one every time, until coding for the plurality of layers is finished, wherein the **Huffman-coding of the plurality of the quantized samples comprises: mapping a plurality of K quantized samples on a bit plane where K is an integer; and coding the samples in units of symbols within a bit range allowed in a layer corresponding to the samples in order from a symbol formed with MSB bits down to a symbol formed with LSB bits by obtaining a scalar value corresponding to the symbol formed with K-bit binary data, and performing Huffman-coding by referring to the K-bit binary data, the obtained scalar value, and a scalar value corresponding to a symbol higher than a current symbol on the bit plane**.

Amended independent claim 6 recites a method for decoding audio data that is coded in a layered structure, with scalability, comprising: inputting audio signal and extracting audio data from said audio signal; differential-decoding additional information containing scale factor information and coding model information corresponding to a first layer; Huffman-decoding the audio data in units of symbols in order from a symbol formed with MSB bits down to a symbol formed with LSB bits and obtaining quantized samples by referring to the coding model information; inversely quantizing the obtained quantized samples by referring to the scale factor

information; inversely MDCT transforming the inversely quantized samples; and repeatedly performing the steps with increasing the ordinal number of the layer one by one every time, until decoding for a predetermined plurality of layers is finished wherein **the Huffman-decoding of audio data comprises: decoding audio data in units of symbols within a bit range allowed in a layer corresponding to the audio data, in order from a symbol formed with MSB bits down to a symbol formed with LSB bits; and obtaining quantized samples from a bit plane on which decoded symbols are arranged; and wherein in decoding audio data, a 4*K bit plane formed with decoded symbols is obtained, and in obtaining quantized samples, K quantized samples are obtained from the 4*K bit plane, where K is an integer**.

Amended independent claim 9 recites an apparatus for decoding audio data that is coded in a layered structure, with scalability, comprising: an unpacking unit which decodes additional information containing scale factor information and coding model information corresponding to a first layer, and by referring to the coding model information, Huffman-decodes audio data in units of symbols in order from a symbol formed with MSB bits down to a symbol formed with LSB bits and obtaining quantized samples; an inverse quantization unit which inversely quantizes the obtained quantized samples by referring to the scale factor information; and an inverse transformation unit which inverse-transforms the inversely quantized samples, wherein **the unpacking unit decodes audio data in units of symbols within a bit range allowed in a layer corresponding to the audio data, in order from a symbol formed with MSB bits down to a symbol formed with LSB bits, and obtains quantized samples from a bit plane on which decoded symbols**

are arranged; and wherein the unpacking unit obtains a 4*K bit plane formed with decoded symbols and then, obtains K quantized samples from the 4*K bit plane, where K is an integer.

Amended independent claim 12 recites an apparatus for coding audio data with scalability comprising: a transformation unit which MDCT transforms the audio data; a quantization unit which quantizes the MDCT-transformed audio data corresponding to each layer, by referring to the scale factor information, and outputs quantized samples; and a packing unit which differential-codes additional information containing scale factor information and coding model information corresponding to each layer, and Huffman-codes the plurality of quantized samples from the quantization unit, in units of symbols in order from a symbol formed with most significant bits (MSB) down to a symbol formed with least significant bits (LSB) by referring to the coding model information, wherein **the packing unit maps a plurality of K quantized samples on a bit plane where K is an integer, codes the samples in units of symbols within a bit range allowed in a layer corresponding to the samples in order from a symbol formed with MSB bits down to a symbol formed with LSB bits by obtaining a scalar value corresponding to the symbol formed with K-bit binary data, and performs Huffman-coding by referring to the K-bit binary data, the obtained scalar value, and a scalar value corresponding to a symbol higher than a current symbol on the bit plane**.

In contrast, Park, which relates to solving a problem wherein an optimal state suitable for a fixed bit rate is searched for then quantized then encoded (col. 2, lines 9-28), discusses that if the transmission bandwidth is lowered due to poor network

conditions in transmitting bitstreams through the network or the like, interruptions may occur and appropriate services cannot be rendered to a user. (Col. 2, lines 9-23). Park is directed to solving the problem when the bitstream desired to be transformed into bitstreams of small size more suitable for mobile apparatuses. (Col. 3, lines 11-17). For example, a re-encoding process is performed in order to reduce the size of the bitstream and the amount of computation that is required increases. (Col. 3, lines 18-35).

Applicants respectfully submit that in light of the problems identified by Park, the bitstream's scalable encoding/decoding method and apparatus using the bit-slice arithmetic coding (BSAC) was developed by the assignee of the present disclosure. In this regard, it should be noted that Park (assigned to the same assignee as the present disclosure) claims priority to KR 97-61298 (filed November 19, 1997), which is discussed in detail in the present specification at page 2, lines 14-29.

According to the BSAC technique, a bitstream coded with a high bit rate can be made into a bitstream with a low bit rate, and restoration is possible with only part of the bitstream. Accordingly, when the network is overloaded, or the performance of the decoder is poor, or a user requests a low bid rate, services with some degree of audio quality can be provided to the user by using only part of the bitstream. However, the quality will inevitably decrease in proportion to the decrease and bit rate. As the BSAC technique adopts arithmetic coding, complexity is high and when the BSAC technique is implemented in an actual apparatus, the cost increases. In addition, since the BSAC technique uses a modified discrete cosine transform (MDCT) for transformation of an audio signal, audio quality in a lower layer may severely deteriorate. (Page 2, lines 14-29 of the present specification).

Applicants respectfully submit that the differences between the coding method recited in the present claims and the BSAC technique of Park include the following. First, in the BSAC technique, coding is performed in units of bits, while the coding of the presently claimed invention is performed in units of symbols. This difference is reflected in the presently pending independent claims. Secondly, in the BSAC technique, arithmetic coding is used, while Huffman coding is used. Arithmetic coding provides a higher compression gain, but increases complexity and cost. Accordingly, in the present invention, data is coded not in units of bits but in units of symbols through Huffman coding such that the complexity and cost actually decreases. (Page 17, lines 6-15 of the present specification).

Applicants further respectfully submit that Park does not disclose or suggest symbols. (Col. 4, lines 37-50 and 64-65). In contrast, Park recites that the digits in the decoding step are "bits". (Col. 4, line 49). Hence, the combination of coding and decoding symbols rather than bits is not shown and, while Huffman decoding is mentioned in passing, it is not mentioned with reference to symbols, as explained above. Applicants respectfully submit that the coding of the plurality of quantized samples comprises mapping a plurality of quantized samples on a bit plane, and coding the samples in units of symbols within a bit range allowed in a layer corresponding to the samples in order from a symbol formed with MSB bits down to a symbol formed with LSB bits. Moreover, in the mapping of the plurality of quantized samples, K quantized samples are mapped on a bit plane, and in the coding of the samples, a scalar value corresponding to the symbol formed with K-bit binary data is obtained, and Huffman coding is performed by referring to the K-bit binary data, the obtained scalar value, and a scalar value corresponding to a symbol

higher than a current symbol on the bit plane, where K is an integer. (Page 3, lines 29-32 and Page 4, lines 1-6 of the present specification).

In accordance with at least the foregoing, Applicants respectfully submit that Park does not disclose or suggest all features recited in amended independent claims 1, 6, 9, and 12. Therefore, amended independent claims 1, 6, 9, and 12 are patentable over Park. Dependent claims 2, 3, and 13-15 are patentable over Park for at least the same reasons.

Accordingly, Applicants respectfully submit that the rejection over Park should be withdrawn.

Rejection under 35 U.S.C. § 103

Claims 5 and 17 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Park in view of U.S. Patent Publication No. 2002/0131084 (hereinafter "Andrew").

As claims 5 and 17 have been cancelled, the rejection of claims 5 and 17 is moot. However, Applicants address hereinbelow this rejection for the sake of completeness as the subject matter of cancelled claims 5 and 17 has been incorporated into claims 1 and 12, respectively. The discussion hereinabove regarding Park and the pending claims is herein incorporated in its entirety. Andrew has been cited merely as allegedly disclosing the features recited in dependent claims 5 and 17. However, as cited, Andrew fails to cure the many above-noted deficiencies of Park. Accordingly, Park and Andrew, either alone or in combination, fail to disclose or suggest all the features of claims 5 and 17. As such, Applicants

respectfully submit that the obviousness rejection over Park and Andrew should be withdrawn for at least the reasons discussed hereinabove.

Conclusion

Applicants invite the Examiner to contact Applicants' representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: August 28, 2008

By: _____
Shruti S. Costales
Registration No. 56,333

Customer No. 21839
P.O. Box 1404
Alexandria, VA 22313-1404
(703) 836-6620